

POISON HEMLOCK

Conium maculatum

Life History/Identification:

Poison hemlock is a highly toxic, biennial herb that can grow between three and eight feet tall. It is most commonly found in the Eastern portion of the United States, but it is also invading the Northwestern and Northcentral regions. The weed has a smooth purple stem and triangular, finely divided leaves with bases that sheathe the stem. The stems are hollow between the nodes, while the leaves resemble those of a fern. Poison hemlock is also characterized by a rank, disagreeable odor that is detectable when one is near the plant, or has crushed a leaf or stem. The odor is associated with the alkaloids that the plant contains. The weed contains eight piperidine alkaloids (including coniine and gamma-conicine), and the toxicity of the plant increases throughout the growing season. In an animal that has been poisoned by hemlock, the odor can be detected in the gut, breath and urine. Poison hemlock has small but attractive white flowers, arranged in umbrella-like clusters, which open in the early summer. The fruit is tiny, flattened, and ridged, about 1/8th of an inch long, and grayish green in color. Seeds ripen in August and September and can be spread by farm equipment, vehicles, agricultural produce, clothing, water and wind. Hemlock is capable of rapid establishment after late-season rains, particularly on disturbed sites or where little vegetation exists. Once it firmly establishes itself under such conditions, the weed can preclude most other vegetation.



Flagstaff Localities:

Poison hemlock is a native of Europe, western Asia, and North Africa. It was brought to the United States as a garden ornamental. The weed commonly occurs in sizable stands of dense populations along roadsides, field margins, ditches, and in low-lying waste areas. It also invades native plant communities in riparian woodlands and open flood plains of rivers and streams. It thrives on shady or moist ground, usually at altitudes below 5,000 feet. However, populations have been found in Flagstaff, at altitudes of 7,000 feet, on Highway 180. An infestation has also been reported on 89A.

Economic Impact:

The toxic qualities of poison hemlock have been known and documented throughout history. It is allegedly the plant used to poison the Greek philosopher Socrates in 339 B.C. At that time, a poison hemlock potion was considered to be a "humane" method of execution for criminals. In one account, after consuming the hemlock potion, Socrates continued his conversation until the effects of the poison traveled up his legs and waist and eventually overtook his body. In the New World, extracts of hemlock have been used as arrow poisons by North American Indians, and it has also been used medicinally as a treatment for tumors, ulcers, and gout. Humans are often poisoned after mistaking the roots for parsnips, the leaves for parsley, or the seeds for anise. The alkaloids have two major toxic effects: they cause acute degradation on the nervous system, and they can cause birth defects. The symptoms of poisoning are nervousness, trembling, loss of motor skills, pupil dilation, weakened heart function, coldness in the extremities, coma, and death through respiratory failure. Concentrations of the alkaloids are highest in the seeds. A lethal dose for a horse is four to five pounds of leaves; cattle may be poisoned with one to two pounds, and sheep with a half pound or less. Due to its unpleasant odor, however, animals do not usually willingly consume poison hemlock when other food is available. It is more likely that the plant is consumed as a contaminant in hay, silage, or alfalfa.

Control:

The prevention of further infestations of poison hemlock is the most effective and least expensive method of control. The most desirable approach to treating an area infested with poison hemlock is that of an integrated pest management plan, which makes optimum use of all control strategies used in controlling non-native weeds.

Cultural Control:

Do not drive through areas contaminated with poison hemlock and then across undisturbed lands. Check vehicles and clothes for attached plants when leaving a disturbed site. On farmlands, be sure to thoroughly clean equipment after use. Use certified weed-free hay in order to prevent the poisoning of livestock.

Mechanical Control:

Hand pulling or grubbing of poison hemlock works easiest with wet soils and with small infestations. When grubbing, it is not necessary to remove the entire root system since the plant is not perennial. It is best to pull or grub out the plant prior to flowering. Follow-up cultivation is necessary to deal with hemlock seedlings and, if possible, a vigorous pasture and/or native seedbank should be established to compete with any further seedling growth. Multiple mowings close to the ground may eventually kill poison hemlock. Mowing or slashing of the plants just before flowering is often an effective method of control, but there may be re-growth near the base of the plant, which requires another treatment. Poison hemlock remains toxic for several years after being pulled, and it is wise not to leave the dead plants where they might be eaten by wildlife and/or children.

Chemical Control *(Noted here are chemical control methods that have been used in other areas. Always check with weed specialists or chemical suppliers before treatment to ensure correct dosage and application. Mention of these products does not imply endorsement by the Northern Arizona Weed Council or The Nature Conservancy.):*

If extensive areas are covered with poison hemlock, chemical controls are simpler and less labor intensive than other control methods. 2,4-D in moderate doses does not kill grasses and has been shown to be successful as a control for poison hemlock. It is most effective when the ester form is mixed with diesel oil to allow penetration of the leaves and stems. It can be used to hand spot (the most effective technique), or to spray larger areas. The suggested mixture is 1.5 pounds acid equivalent per acre. Mix two quarts of diesel oil with 1.5 pounds of 2,4-D ester and add 100 gallons of water in a spray tank. A 100-gallon tank should cover approximately one acre. Banvel™ (chemical name: dicamba) also works on broad-leaved plants, but not as effectively as 2,4-D. The suggested mixture is ½ to ¾ per 100 gallons of water and a surfactant is required.

Biological Control *(No exotic species should be introduced into an ecosystem without extensive research into the long-term effects. Mention of the species below does not imply appropriateness for use in Northern Arizona.):*

There are no known methods of effective biological control of poison hemlock. The weed is often infected by one or more strains of virus, such as ringspot virus, carrot thin leaf virus, alfalfa mosaic virus, and celery mosaic virus. However, stands of poison hemlock seem to survive in spite of viral attack. More often than not, the virus-infected plant is stunted rather than killed. The usability of insects to control the plant needs more experimentation, as poison hemlock hosts only a few insect species. Apparently, since this weed was introduced into North America, only a few native insects have been able to overcome its toxic defenses and feed on the plant. Those that do, attack the seedhead, but do very little damage to the rest of the plant.

Note: No single control method, or any one-year treatment plan, will ever achieve effective control of an area contaminated with poison hemlock. The fast growth, aggressive spread, and large number of seeds require long-term cooperative integrated management programs and planning to prevent, contain, and reduce poison hemlock infestations.

Moser, L; D. Crisp. San Francisco Peaks Weed Management Area fact sheet on *Conium maculatum*. Coconino National Forest.